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CASE REPORT OPEN ACCESS

The Role of Radiologic and Scintigraphic Imaging in Differentiating Thoracic Pyogenic Spondylodiscitis from Metastasis

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Introduction: Physical examination, basic laboratory tests and plain radiographs can give important data in diagnosis of the patients presenting with complaints of back pain. However, advanced imaging tools may be necessary for further evaluation of complicated processes in geriatric patients.

Case presentation: We presented plain radiography, magnetic resonance imaging (MRI) and bone scintigraphy (BS) findings of thoracic pyogenic spondylodiscitis in a 72-year-old male patient which resembles metastatic disease.

Conclusion: Multimodal imaging, particularly MRI and BS can provide useful data in the initial diagnosis and follow-up of geriatric patients with a complicated vertebral pathology. Spondylodiscitis can mimic metastastatic disease.

Keywords: Spine, discitis, neoplasm, metastasis; magnetic resonance imaging, radionuclide imaging

Introduction

Secondary vertebral malignancies such as metastasis from endometrial cancer can resemble spondylodiscitis in some cases (1). However, spondylodiscitis can also mimic metastastatic disease such as metastases from prostate cancer (2) or urothelial carcinoma (3). Malignant neoplastic disease of the spine in geriatric patients is common, and its most frequently seen form is secondary metastatic disease (4). An increase in incidence of spondylodiscitis has been reported in recent years (5). Though routine physical examination, laboratory tests and plain radiographs provide significant information, it may be difficult to differentiate these two entities and advanced imaging tools may be required especially in complicated geriatric cases presenting with severe back pain. The role of magnetic resonance imaging (MRI) and bone scintigraphy (BS) in bone metastases and bone infections is well defined (6). Here we present the contribution of plain radiography, MRI and BS in the management of thoracic pyogenic spondylodiscitis which resembles metastatic disease in a geriatric case.

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Case **Presentation**

A 72-year-old male was referred with complaints of severe pain in his upper back which has been lasting for two months. All the procedures were performed according to the World Medical Association Declaration of Helsinki (revised in 2000, Edinburgh).

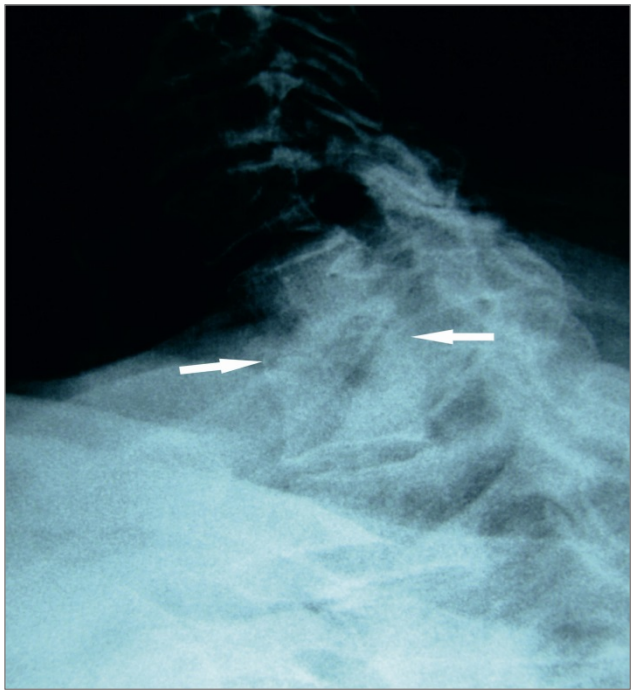

Figure-1. Narrowed T1–2 intervertebral disc space & sclerotic appearance of end-plates on lateral plain graph (white arrows)

The patient was informed about procedures and consent was obtained from him. Patient's history revealed that he had experienced several interventions for dilatation of urethral stricture, a transurethral resection of a bladder mass and frequent urinary tract infections. Physical examination findings were limitation in body movements, pain with lumbar extension, a relatively hard prostate gland and subfebrile fever (37.7 ^{o}C). Patient's reflexes, muscle strength and sensory examinations were normal. In laboratory tests, C-reactive protein (CRP) was 26.5 mg/L and erythrocyte sedimentation rate (ESR) was 51 mm/h.

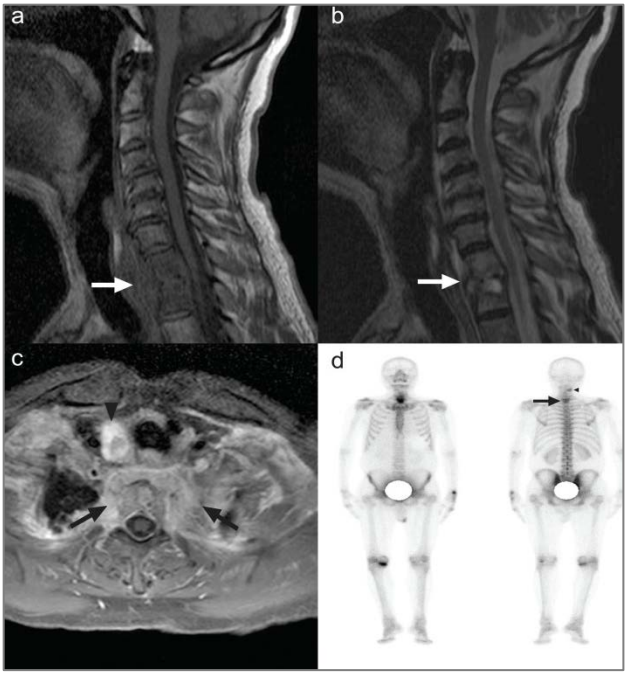

Figure 2 a–d. T1 and T2 vertebra corpuses and paravertebral soft tissue mass shows hypointensity on sagittal unenhanced T1-weighted image (a)and slight, heterogenous hyperintensity on T2-weighted image (b) (white arrows). Signal intensity of narrowed, irregular intervertebral disc space is similar to neighbouring vertebral end-plates. Axial contrast-enhanced, fat-saturated T1-weighted image(c)demonstrates hyperintense nodular lesion in right lobe of thyroid (black arrowhead) and pathologic contrast-enhancement in vertebrae corpuses and paravertebral soft tissues (black arrows). Whole-body BS (d) shows a focal, increased uptake in soft tissue of middle cervical region on right side (black arrowhead) and a diffuse, pathological, increaseduptake in T1–2 vertebrae (black arrow).

Figure 3 a–c. Sagittal T1-weighted (a), T2-weighted (b) MRI and whole-body BS (c) show a significant regression in T1–2 vertebrae as compared with the images before the treatment (white and black arrows).

His urine appeared blurred, in which abundant leukocyturia (82 leukocytes in each field) and (++) gram negative bacilli were detected. His serum prostate-specific antigen level was in normal range. Cystoscopy was unsuccessful because of urethral stricture. On his lateral upper thoracic plain radiograph, narrowing in T1–2 intervertebral disc space and sclerotic appearance in the end-plates surrounding the disc space were detected (Figure-1).

On thoracic MRI, T1 and T2 vertebra corpuses and adjacent paravertebral soft tissue mass showed hypointensity on T1-weighted images (Figure-2a) and slight, heterogenous hyper-intensity on T2-weighted images (Figure-2b). Signal intensity of narrowed, irregular inter-vertebral disc space was similar to that of neighbouring vertebral end-plates. Contrast-enhanced, fat-saturated T1-weighted axial images revealed pathologic enhancement in the vertebral corpuses, pedicles and para-vertebral soft tissues, besides a hyperintense nodular lesion in the right lobe of thyroid gland (Figure-2c). In whole-body BS, increased focal uptake in soft tissue of middle cervical region on the right side and a diffuse, patho-logical, increased uptake in T1–2 vertebrae were observed (Figure-2d). On ultrasono-graphy (US) of the neck, a thyroid nodule having calcifications in the right lobe of thyroid gland was detected and US-guided fine needle aspiration biopsy of the nodule revealed benign cytology.

In differential diagnosis, malignant metastatic disease of thoracic vertebrae was considered, but the diagnosis of pyogenic spondylo discitis was eventually made following the evaluation of clinical, laboratory and imaging findings. After application of medical therapy with antibiotics and anti-inflammatory drugs besides immobilisation, patient was revaluated six months later. A significant decrease in pain level and in limitation of movements was observed. Serum CRP and serum ESR values were lower than the initial ones, which were recorded as 11.6 mg/L and 34 mm/h, respectively. Urine tests were normal. In control thoracic MRI and BS (Figure 3a–c), significant regression in vertebral lesions was detected.

Discussion

Common reasons for back pain in geriatric age group are primary or metastatic tumours, fractures, degenerative or infectious disc diseases. Spine is a major site for bone metastases (6) particularly in geriatric cancer patients (4). In the presence of discogenic sclerosis, great care should be taken to exclude neoplastic disease.

Recurrent urinary system infection or surgery can pave the way for an infection to reach the vertebral column through the venous system (5, 7). The most common predisposing factors are genitourinary, soft tissue and gastrointestinal infections, where pyogenic bacteria (*staphylococcus aureus*, *streptococcus* species and gram negative bacilli) are the most commonly determined pathogens (6, 8, 9). Microorganisms can spread into the vertebral end-plate or the intervertebral disc region (6, 10, 11).

Plain radiography has a role in diagnosis of vertebral osteomyelitis and metastases, in which narrowing of disc space can be the earliest radiographic sign in osteomyelitis and ostelytic/osteoblastic lesions can represent metastases (6). However, MRI can be preferred to evaluate both infectious and malignant processes (4, 5, 12). Non-specific Modic type-1 alteration in the early stage of vertebral osteomyelitis is quite common (7). In most of

the cases with spondylodiscitis, hypointensity on T1-weighted images, hyperintensity on T2-weighted images in vertebral corpuses and intervertebral discs are demonstrated.

Infection typically surrounds disc space (6) and intervertebral disc involvement is more frequent finding for infectious spondylodiscitis, but these are very rare in malignant disease of spine (4, 13). In the present case, besides vertebral corpuses, T1–2 intervertebral disc involvement was prominent, which helped us in making the diagnosis of spondylodiscitis rather than malignant disease of spine, either primary or metastatic. In evaluating the spinal infections, obtaining contrast-enhanced, fat-saturated images besides routine sequences is recommended. In differentiation of pyogenic and tuberculous spondylitis, contrast-enhanced MRI images can be useful.

A thin, smooth and enhancing abscess wall, a well-defined paraspinal abnormal signal, subligamentous spread to three or more vertebral levels and multiple vertebral or entire body involvement were more suggestive of tuberculous than pyogenic spondylitis (10). In the present case, clinical and laboratory findings besides treatment results after six months were in favour of pyogenic etiology. In suspicious cases without a known primary tumour, a whole-body BS with ^{99m}Tc-labeled biphos-phonates is often preferred for the initial evaluation of skeletal system, as we did in the present case. In our case, initial and control BS revealed that the pathology was rather localized unlike most bone metastases and therefore helped us in making the diagnosis.

Though spondylodiscitis can be differen-tiated from vertebral metastases even in complicated cases including the patients who underwent previous spinal irradiation (12), it may be challenging to differentiate these two entities in patients presenting with the involvement of several contiguous vertebrae on MRI (14). In such cases, short-term MRI follow-up of the patients who are on antibiotic treatment, and computed tomography-guided biopsy will help in differentiation of them (14, 15).

In the present case, we did not need to perform biopsy because by using MRI and BS images we could be able to demonstrate rather active and progressive phase of pyogenic spondylodiscitis at the time of initial diagnosis and also regression of the pathology after the treatment. It was stated that in vertebral lesions of unknown origin, spondylodiscitis or new primary lesion should be taken into consideration rather than metastatic disease in differential diagnosis, even though the patient gives a history of a former malignancy (15). We consider that it will be appropriate to decide about the best time for control imaging after evaluating the initial clinical, laboratory and imaging findings.

Conclusion

Multimodal imaging, particularly MRI and BS can provide useful data in the initial diagnosis and follow-up of a geriatric patient with a complicated vertebral pathology, as it was in our case.

Acknowledgement

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